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Cardiology Conference 2017: Percutaneous coronary intervention of saphenous vein bypass grafts: Current state of the art - Michael P Savage - Thomas Jefferson University Hospital, USA

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Saphenous vein grafts (SVG) are the most common channel used in coronary artery bypass surgery. However, within a decade from surgery almost 50% of SVG will develop significant disease. Percutaneous coronary intervention (PCI) of diseased SVG is associated with a high risk of distal embolization, no-reflow, periprocedural myocardial infarction (MI), & late restenosis. This review examines the evolutionary advances & status of PCI for this challenging problem. Role of Stents: The outstanding role of coronary stenting for SVG disease was established by the SAVED trial. Compared to balloon angioplasty, bare metal stents resulted in improved procedural & angiographic outcomes. At 240 days, event-free survival was a bit higher in the stent group (73 vs. 58%, p=0.04). The role of drug-eluting stents (DES) remained uncertain initially due to the mixed results of smaller randomized trials. The superiority of drug-eluting stents was solidified by the 610 patient ISAR-CABG trial which demonstrated fewer cardiac events at 1 year with DES (15.4 vs. 22.1%, p=0.03). Optimal duration of dual antiplatelet therapy after Saphenous vein grafts stenting has not been established. However, late & very late stent thrombosis occurs more frequently in Saphenous vein grafts. Distal Embolization: Saphenous vein grafts intervention is fraught with a high risk of ischemic complications due to distal embolization. In the landmark SAFER trial, use of a distal protection device resulted in a 42% relative reduction in early cardiac events. Despite the evidence of clinical benefit & guideline class I recommendation, distal protection device are used in <25% of Saphenous vein grafts PCI. Delivery of filter devices can be technically challenging in complex Saphenous vein grafts & this likely contributes to the reticence of some operators to use them. We have recently reported the value of simple adjunct techniques to facilitate the successful deployment of distal protection device in Saphenous vein grafts. No-Reflow: The development of no-reflow during PCI is a significant risk factor for MI & death. distal protection device is reduced but not eliminated no-reflow, which is a complex phenomenon involving both debris embolization & microvascular spasm. A variety of vasodilating drugs have been used to treat no-reflow including calcium channel blockers, adenosine, & nitroprusside. In the largest series of patients treated with drug therapy for no-reflow, intracoronary nicardipine was found to be over 98% successful in reversing no-reflow during PCI. It has been suggested that pretreatment with intracoronary nicardipine or other vasodilating agents may reduce the incidence of SVG no-reflow. In current practice, we utilize the apparent synergistic effect of prophylactic intracoronary nicardipine & distal protection filters in vein graft PCI. Compared to use of distal protection device alone, the combination of drug + device is associated with significantly fewer per procedural death/MI (10 vs. 1%, p<0.01). Conclusion: Significant technical & procedural advances have improved the outcome of high risk SVG intervention.

The trial data demonstrate the efficacy of all three EPD classes in minimizing ischemic complications. Its use must account for the degree of distal embolization risk & the complexity of the coronary anatomy itself, especially when certain EPDs require distal landing zones. As indicated in the ACCF/AHA/SCAI guidelines, EPDs should ultimately be used during SVG intervention whenever feasible. Although these devices have proven effective during SVG intervention, they remain remarkably underutilized. An evaluation of 19,546 SVG PCI procedures in the American College of Cardiology-National Cardiovascular Data Registry found that EPDs were used in only 22 % of cases, despite being independently associated with a lower incidence of no-reflow (OR 0.68; P=0.032). One potential reason for this underutilization could be that the delivery sheath heft makes distal filter deployment challenging. A recent study by Kaliyadan et al. highlighted the use of adjunct delivery techniques to optimize filter delivery in SVG procedures. Deployment failure in this study was reduced from 21.9 % initially to 7.6 % after using adjunct delivery techniques (P<0.01). Such techniques that facilitate device delivery success could potentially improve clinical outcomes & promote more frequent use of distal protection.

SVG conduit degeneration, restenosis, & friable lesions with high embolic potential attenuate long-term CABG survival, while SVG intervention remains susceptible to high rates of periprocedural MI & no-reflow. When SVG disease requires intervention, proper stents, EPDs & pharmacological selection are essential for minimizing complications. Both first- & second-generation DES demonstrate superiority over BMS in SVG intervention. The ACCF/AHA/SCAI guidelines recommend EPD use whenever feasible during SVG intervention to decrease the risk of embolization complications. The optimal pharmacological treatment for slow or no-reflow is unclear, but various vasodilators show promise. When achievable, pan-arterial revascularization or hybrid native coronary stenting with arterial revascularization should be considered to minimize vein graft conduits in CABG.

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